REMARKS

Claims 1-7 remain pending in the present application. Claim 1 is amended herein. Claim 8 remains cancelled.

Applicant's attorney would like to thank patent examiner Chun-Cheng Wang for his time and courtesy extended during a telephonic interview conducted on September 25, 2009 in which claim 1 was discussed in view of the final office action. While no agreement was reached, Applicant submits the following arguments in favor of patentability of the present invention.

REJECTION UNDER 35 U.S.C. § 103(a)

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Field et al. (U.S. Pat. Pub. No.20040077738) in view of Ratke et al (EP1077097) It is noted that the Examiner refers to "Lorenz EP107709" through out the office action. Correction is made herein to "Ratke EP1077097" as Lorenz refers to the given name of the Patentee. In this regard, the Examiner contends that Field discloses an insulation composite aerogel-hollow particle binder composition and that the insulation composite and aerogel-hollow particle binder composition can be molded to provide insulation articles such as tiles, panels, or various shaped articles. The Examiner further contends that Field discloses the insulation base layer having a thermal conductivity of about 35 mW/(niK) after drying and that suitable hydrophobic aerogel particles include organic aerogel particles, such as resorcinol-formaldehyde or melamine-formaldehyde aerogel particles.

The Examiner correctly acknowledges that Field et al. is silent as to carbon aerogel molded parts.

The Examiner goes on to note that Ratke et al. `097 discloses resorcinol-formaldehyde aerogel molded parts in which the plastic aerogel can be converted to carbon aerogel in vacuum or protective gas at temperatures above 1000°C and that the carbon aerogels have extremely small effective thermal conductivities and are significantly light.

The Examiner contends that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to pyrolyze the resorcinol-formaldehyde aerogel to have significantly lighter molded parts.

This rejection is respectfully traversed. Further, Applicant submits that the rejection has been rendered moot by the amendments to the pending claims.

As amended, claim 1 now specifically requires that the pore space between the hollow spheres is essentially completely filled with carbon aerogel. Support for this limitation can be found on page 8, in the first full paragraph of the application as filed, for example.

As a result of the essentially complete filling of the pore space between the hollow spheres with the carbon aerogel there is virtually no free space in which heat transport can occur via a gas phase between the particles. A detailed explanation on this concept is presented below. Applicant submits that a thorough review of Field et al and Ratke et al failed to teach or disclose this complete filling concept, alone or in combination.

By way of technical discussion, a composite of an aerogel binder and a sand (in the case of this patent application, a hollow sphere) consists macroscopically of three

phases: (1) hollow sand, (2) aerogel binder and (3) macro-pores filled with air. The pore space between the hollow sand is typically partially filled with an aerogel as is the case under Field et al and/or Ratke et al.

Applicant has determined that the amount of un-filled pore space depends in large part on the amount of binder used. Aerogel-sand (hollow spheres) binder mixtures typically employed are in amounts varying from 3 to 22 wt% (the maximum number depends on the sand, its morphology, the size spectrum). Typically, the sand is compacted manually, leading to a packing density higher than random loose packing and, therefore, the pore space between the hollow spheres is around 30-45 volume percent. Thus, since aerogelic binder (RF-sol) of the present invention has a density of around 1.1 (slightly higher than water), a calculation shows that completely filling the pore space requires the addition of RF-sols in the range of 35 to 50 wt% RF-sol versus the 3 – 22 wt% normally employed.

Described in the pending patent application is a situation in which a volume content of RF aerogel of 30 Vol% is disclosed, meaning the pore space was filled almost completely for the given packed core. Applicant notes too that the aerogel structure inside the pore space of sands (hollow spheres) or other solid materials is different from the microstructure the same aerogel would have in a typical (loosely packed) aerogel structure.. Monolithic RF-aerogels would typically exhibit a microstrucure of (spherical) particles connected in 3D having diameters in the range of 100 nm to 2000nm. In contrast, the particles inside the pore space of a core under the present invention would have diameters of much less than 100 nm. Thus, as the mean free path of an air molecule at ambient conditions is about 70 nm, wall effects become

important and a very low heat conductivity results. Therefore, filling the pore space with RF-sol, gelation and drying yields a reduced heat conduction in the pore space compared to a situation in which the pore space is only partially filled or not filled at all as appears to be the case wit Field et al and Ratke et al.

Claim 7 is rejected under 35 U.S.C. § 103(a) as being anticipated by Field et al. (U.S. Pat. Pub. No.20040077738) in view of Ratke et al (EP1077097).

The Examiner contends that Field et al discloses a method for the preparation of an aerogel molded part comprising: a) preparation of a sol; b) mixing the sol with filler; c) gelling of the sol; and d) drying of the gel. However, the Examiner correctly identifies Field et al. is silent on pyrolyzing the resultant aerogel molded part.

The Examiner further contends that Ratke et al. `097 discloses plastic aerogel that can be converted to carbon aerogel in vacuum or protective gas with temperature above 1000℃ and that the carbon aerogels have extreme small effective thermal conductivities and are significant light. In light of such benefits, the Examiner further contends that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to pyrolyze the plastic aerogel to have significant lighter molded part.

The rejection of claim 7 is believed to be rendered moot as claim 7 depends from claim 1. Applicant submits that claim 7 should be in a condition for allowance as explained above with respect to the rejection of claim 1.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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